IITRI
IIT RESEARCH INSTITUTE

IIT Research Institute ESAT Region 5
536 South Clark Street, Suite 1050; Chicago, IL 60605
Telephone (312) 353-8302 Facsimile (312) 353-8307

To: Steve Peterson
Brad Benning

cc: J. Morris
J. Thakkar
M. Kaminsky

From: J. Ganz

Date: April 20, 2001

TDF: 5-03-005

Re: XRF analyses for the JPIT Melt Shop

One ESAT analyst drove to the JPIT Melt Shop in Chicago on April 16, 2001 for the purpose of performing XRF analysis on soil and dust samples associated with this site. The TDF requires the samples to be analyzed for lead and chromium; however, the on-site coordinator (OSC) requested analysis for lead and cadmium. There was no interest in chromium.

A workstation was set up just inside the entrance to a building which was part of the area under investigation. A zone surrounding this entrance was designated as a "clean area"; the sampling crew used this zone for decontaminating and changing clothing. The instrument used was the Spectrace 9000 XRF. The XRF was set up and allowed to warm up and adapt to the ambient temperature (approximately 35 degrees F) for one hour.

The samples had already been dried and ground and stored in plastic bags when the analyst arrived at the site. Sample aliquots were placed into the XRF sample cups in preparation for analysis.

After the instrument had been allowed to stand for an hour, the analyst analyzed a series of soil standards supplied by Outokumpu Electronics containing lead and cadmium in order to estimate the reliability of the concentration readings obtained from the instrument. From this data it was observed that cadmium values were biased high by up to 35% while the lead values were biased low by up to 20% for readings greater than 400 ug/l. For lead readings less than 400 the bias was 35%.

Readings for all standards and samples were taken using three radiation sources: cadmium 109, iron 55, and americium 241. The exposure time was 200 seconds for each source, or 600 seconds total.

The table below lists the cadmium and lead readings for the samples supplied to the analyst.

Sample	Lead (ppm)	Cadmium (ppm)
3A	434	138
3I	162	125
3G	44	639
3H	81	187
3B	46	162
3C	94	133
3D	40	38
3E	155	238
3F	124	282
Slagpile	ND	178
Drum	1254	116
2B	83	347
2A	330	162
2C	247	173
2D	505	189
2E	ND	568
2F	ND	271
2G	111	260
2H	ND	440
2I	ND	600